stupenduous extent. Other description of the great cells does not differ materially from that already given by other writers (Obersteiner).

Beyond the Purkinje cell layer, extending as high as the limit of the inferior third of the molecular layer, lie considerable numbers of small, rounded and angular multipolar cells, with distinct protoplasm, large nuclei containing coarse grains, and well developed prolongations. The largest of these are 18x12 and are undoubtedly nerve cells. In their neighborhood, but peripherally, are numbers of still smaller cells with a relatively large nucleus, and ill-defined though present protoplasm. These do not belong to any of the glia types, and are almost certainly, like their larger neighbors, nerve cells. The fibres of the third variety of medullated tubes of the central core pass to these nerve cells, and are lost upon reaching them.

Neuroglia nuclei are sparingly distributed through the barren layer, the place of their supporting extensions being taken by the fibrillæ that extend from the "limitans externa" and its pial connections. A distinct arrangement of glia cells with fine tentacles is found along the outer margin of the barren zone, that are only to be seen in Nissl sections. Beyond this margin lies a sub-pial lymph space of considerable extent, and from the inner layers of the vascular pia, connective tissue threads extend into and through the molecular layer to the "limitans interna."

The article concludes with the statement, that the nerve elements of the cerebellum viewed as a unit bespeak a sensory and not a motor organ, and elaborates the likeness of the cellular bodies to certain other already ascertained sensory elements. Seven drawings accompany the paper. J. C.

An Investigation of the Structure of Spinal Ganglia.—Erik Müller (*Nordisk Medicinsk Archiv*, 1891, No. 26). The author has, by means of the isolation method and serial cuts, investigated the structure of the spinal ganglia in newly born and growing rabbits. He considers first the form and arrangement of the cells and shows in opposition to most authors that the cells, in young animals are not always isolated. Very often there were to be seen accumulation of cells, cell colonies which stood in close communication one with another, but which varied very much in their form and gross relationship. These colonies are in part regular, made up of three or four cells having a circular running capsule about them, and in part irregular with cells of different forms and sizes. The development of the cells is very slow and reaches its eventual stage in quite a late period of life. Concerning the protoplasmic ramifications of the cells, the author says he cannot speak positively. He takes it for granted, however, that they pass into formed apolar ganglion cells. The second part of this article is concerned with the structure of the spinal ganglion cells. So far as the protoplasm is concerned the author is in entire accord with Flemming. The cells possess, as a rule, one or two nucleoli and occasionally four or five. Some cells, both in young and old animals, have nuclei which stain much more deeply with the coloring matter than does the ordinary cells. Such cells are neither oval nor round in shape, but frequently are spindle or irregular shaped. The peculiarity of the protoplasm, described by Fritsch and Lahousse, in which the protoplasmic shreds passed out through the capsule into the ground substance, the author was not able to corroborate. On the other hand, he found that the cells do not lay naked in their capsule, but have a very fine membrane arising from the cell protoplasm delicately surrounding them.

The third part of the paper is taken up with a consideration of the basis and structural substance of the cells. The author's investigations convince him that the capsule of the ganglion cells blends with the membranes of the other cells in intimate relationship, so that the ganglion cells really lay in one mesh of network. Where the cells are separated by a considerable space, there can be made out a very fine membraneous formation which passes in different directions through the space and makes up a fine delicate network. In all probability the capsule of the cells passes to and blend with Henle's sheath of the nerves, while the previously spoken of ectoplasmatic cell membrane passes to blend with the sheath of Schwann.

The author considers briefly the embryonic relations and histogenesis of the ganglion cells, and gives in detail the methods of investigation and stainings employed. (*Centbl. f. Nervenheilk u. Psych. Rep.*, March, 1893).

J. C.